

REMARKS

Claims 1-24 are currently pending. Independent claims 1, 3, 4, 13, 15 and 16 have been amended, as shown above. Additionally, minor errors in the reference numbers have been corrected in the written description. In light of these changes, reconsideration of the present application is respectfully requested.

As an initial note, the undersigned would like to thank the Examiner for the thoroughness and clarity of his action.

The Office Action includes a rejection of claims 1-5, 7, 8, 10 and 11 under 35 U.S.C. §102(e) as allegedly being anticipated by the *Oh et al.* patent (U.S. Patent No. 6,734,091) and a rejection of claims 9, 12-17 and 19-22 under 35 U.S.C. §103 as allegedly being unpatentable over the Applicant's description of prior art in view of the *Oh et al.* patent. These rejections are respectfully traversed.

In the remarks, the Examiner provided the helpful comment that he is interpreting the claims in a manner that would permit the second annealing to occur after unrecited additional metallic layers are added to the p-type compound semiconductor layer. Hence, Applicants are of the understanding that the Examiner realizes that the present invention is significantly different from the applied art, but has an issue with the wording of the claim, preferring that it more expressly reflect certain aspects of the invention.

It is respectfully submitted that claim 1 recites as a step forming the p-type electrode on the annealed p-type compound semiconductor layer. Because the only prior reference to the annealing is that the annealing occurs twice, Applicants respectfully submit that original claim 1 should be interpreted as recited that the p-

type electrode is formed on the twice annealed p-type compound semiconductor layer. Insofar as adding the word "twice" to claim 1 does not change its original meaning, Applicants gladly do so to emphasize this aspect of the invention.

Similarly, the Office's comment to forming the third metallic layer reads on the step of forming a p-type electrode on the annealed p-type compound semiconductor layer is believed to be incorrect since the claim does not call for *completing* the p-type electrode, but rather forming a p-type electrode. Even one metal layer forms an electrode, though the three layers disclosed in the applied art add to this purpose. However, it is also understood that the word "on" as meant in the context of the present application means "in contact with." Hence, this phrase has been adopted to make clear that the p-type electrode must be in contact with the twice annealed p-types of compound semiconductor layer. The third metallic layer cannot therefore constitute this p-type electrode insofar as there are two intervening metallic layers.

Having changed the claim language in a manner believed to accommodate the Examiner's concerns, Applicants respectfully request withdrawal of this rejection.

With respect to the rejection over Applicant's description of prior art in view of the *Oh et al.* patent, it is respectfully submitted that the same logic applies. Stated differently, the hypothetical combination of Applicant's description of prior art and the *Oh et al.* patent, even if one were to assume it would be appropriate to combine the teachings, would not result in the present invention for the reasons stated above.

The Office Action also includes a rejection of claims 1-24 under 35 U.S.C. §103 as allegedly being unpatentable over the *Rennie* patent (U.S. Patent

No. 6,057,564) in view of the *Okumura* patent (U.S. Patent 6,370,176). This rejection is also respectfully traversed.

As correctly pointed out by the Examiner, the *Rennie* patent discloses thermally treating the resultant structure of a p-type compound semiconductor layer on an active layer in an oxygen containing ambient atmosphere to form an oxide layer on the p-type compound semiconductor layer. The Office suggests that this reads on the "second" annealing step. The Office also volunteers that the *Rennie* patent does not disclose the claim first annealing step, particularly in a nitrogen atmosphere. However, the Office believes that the *Okumura* patent teaches annealing a p-type GaN layer in a nitrogen atmosphere. The Office then asserts that the combination would have been obvious to one skilled in the art "for the benefit of reducing the resistance of the p-type GaN contact layer (9)." However, Applicants question whether this alleged motivation can be found in the prior art.

The *Rennie* patent discloses that the first thermal treatment is to provide a "very thin layer of pure oxide" in the surface while removing F atoms from the surface "to obtain a near perfect ohmic contact to the GaN layer" through thermal treatment as articulated in column 6, lines 54-59. On the other hand, the *Okumura* patent discloses at column 8, lines 44-46 that a GaN group epitaxial wafer is annealed in a nitrogen atmosphere at 800°C to reduce the resistance of the Mg-doped p-type layers. It is pointed out that the *Rennie* patent does not involve an Mg-doped p-type layer and therefore for this disclose of annealing it in a nitrogen gas atmosphere would not seem to apply to the GaN layer of the *Rennie* patent.

Similarly, the *Rennie* patents disclosure would not seem to have direct application to the *Okumura* patent. However, even if one were to assume that there were some applicability to the disclosure of one patent to the other, there would still be no suggestion for using both annealing steps, particularly one in an oxygen atmosphere and the other in a nitrogen atmosphere, as recited in the pending claims.

It is also noted that the *Rennie* patent suggests that it obtains a near perfect ohmic contact and therefore there would be little motivation to modify its structure having such a stellar result.

While other distinctions exist between the applied art and the present invention, these distinctions will not be belabored, particularly with reference to the dependent claims, for sake of brevity.

In light of the above, Applicants respectfully request reconsideration and allowance of the present application. Should any residual issues exist, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,

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